

WHAT IS CLAIMED IS:

- 1 1. An isolated stem cell sustainable in culture under glycolytic conditions
2 and which maintains the potential to differentiate.
- 1 2. The stem cell of claim 1 which is unipotent or pluripotent.
- 1 3. The stem cell of claim 1 which is an embryonic or somatic stem cell.
- 1 4. The stem cell of claim 3 which is a pluripotent cell from a
2 preimplantation embryo.
- 1 5. The stem cell of claim 1 which is a primordial germ cell.
- 1 6. The stem cell of claim 1 selected from the group consisting of
2 hematopoietic, neuronal and mesenchymal stem cells.
- 1 7. An isolated stem cell which cell shows characteristic green staining
2 with the mitochondrial marker JC-1.
- 1 8. An isolated stem cell which cell displays a low mitochondrial inner
2 membrane potential based upon JC-1 green staining.
- 1 9. An isolated stem cell which cell displays a high mitochondrial inner
2 membrane potential based upon JC-1 red staining.
- 1 10. A method of isolating a stem cell, comprising the steps of:
2 (a) isolating a blastocyst;
3 (b) identifying those cells which rely upon glycolysis for survival;
4 (c) isolating a glycolytic cell from the inner cell mass of the blastocyst;
5 and
6 (d) culturing the isolated glycolytic cell to obtain an isolated stem cell.
- 1 11. The method of claim 10, wherein the cells are identified by staining
2 with the mitochondrial marker JC-1.
- 1 12. The method of claim 10, further comprising maintaining the isolated
2 cells on a fibroblast feeder layer to prevent differentiation.

- 1 13. A chimeric animal produced from a cell of claims 1 or 9.
- 1 14. A method of producing a chimeric animal comprising
2 (a) isolating a blastocyst;
3 (b) identifying those cells which rely upon glycolysis for survival;
4 (c) isolating the glycolytic cells from the inner cell mass of the blastocyst;
5 (d) transfecting a desired gene into the glycolytic cells;
6 (e) injecting the transfected cells into recipient blastocysts;
7 (f) implanting the transformed blastocysts into a host uterus; and
8 (g) nurturing the blastocysts to develop to term.
- 1 15. A method of producing glycolytic-dependent cells, comprising the
2 steps of:
3 (a) culturing cells under hypoxic conditions;
4 (b) identifying those cells which rely upon glycolysis for survival;
5 (c) isolating the glycolytic cells from the culture; and
6 (d) culturing the isolated glycolytic cells.
- 1 16. A stem cell of claims 1 or 9 which is a mammalian stem cell.
- 1 17. A chimeric mammal produced from a stem cell of claim 16.
- 1 18. An isolated stem cell, wherein said stem cell can be identified by
2 staining said cell with the fluorescent dye JC-1.
- 1 19. The isolated stem cell of claim 18, wherein said cell is sensitive to
2 inhibitors of multidrug resistance (MDR) targets.
- 1 20. The isolated stem cell of claim 19, wherein said inhibitors are selected
2 from the group consisting of verapamil, reserpine, and cyclosporine A.
- 1 21. The isolated stem cell of claim 19, wherein the multidrug resistance
2 (MDR) target is an MDR-like dye efflux pump.
- 1 22. A method of identifying functionally distinct stem cells, comprising:
2 (a) staining the cells with the fluorescent dye JC-1;

- 3 (b) sorting the stained cells by fluorescence activated cell sorting
4 (FACS);
5 (c) analyzing said functionally distinct stem cells by comparing
6 their sensitivity to inhibitors of multidrug resistance (MDR) targets; and
7 (d) identifying a MDR-inhibitor sensitive JC-1 subpopulation of
8 cells.

1 23. The MDR-inhibitor sensitive JC-1 subpopulation of claim 22, wherein
2 said subpopulation has an increased differentiation permissiveness.
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1 24. A method of switching embryonic stem cells between two
2 subpopulations, comprising:

- 3 a) exposing a JC-1 green subpopulation to inhibitors of multidrug
4 resistance genes; and
5 b) overexpressing recombinant multidrug resistance genes in a JC-1
6 red subpopulation.
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1 25. The method of claim 24, wherein said inhibitors are selected from the
2 group consisting of verapamil, reserpine and cyclosporine.

1 26. A method of changing a cell's ability to differentiate by switching the
2 subpopulations of claim 24.

1 27. An embryonic stem cell which is differentiated by the method of claim
2 24.
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